

**We claim:**

1. An multi-protocol label switching (MPLS) packet network, having at least one source edge router, at least  
 5 one label switch router, and at least one destination edge router connected by transmission links, and using a packet transport protocol providing a protocol type indicator of the transported packet, the network comprising:

means for assigning different protocol type indicators  
 10 for user MPLS packets and non-user MPLS packets of at least one additional protocol type;

means at the source edge router for transmitting the non-user MPLS packets;

means at the label switch router for forwarding MPLS  
 15 packets received from the source edge router or from another label switch router in such a manner as to preserve the protocol type indicator of the packet transport protocol of each received MPLS packet; and

means at the destination edge router for recognizing  
 20 the protocol type indicator of the transport protocol of the MPLS packets received from the label switch router and means for segregating the user MPLS packets from non-user MPLS packets.

2. The network of claim 1, wherein in the source edge router the means for transmitting the non-user MPLS packets of the additional protocol type comprises a means for transmitting the non-user MPLS packets of said additional protocol type with the same MPLS labels as user MPLS packets.

3. The network of claim 2, wherein the means for segregating the user MPLS packets from non-user MPLS packets comprises a means for segregating, based on said protocol type, MPLS packets received with the same MPLS label.

4. The network of claim 3, wherein the source edge router further comprises a means for sending non-user MPLS packets to the destination edge router, using the same label switched path as for the user MPLS packets.

5. The network of claim 4, wherein the means for transmitting non-user MPLS packets comprises means for transmitting signalling frames between the edge routers.

6. The network of claim 4, wherein the means for transmitting non-user MPLS packets comprises means for transmitting OAM frames between the edge routers.

5 7. The network of claim 6, the network further comprising a means for monitoring said label switched path by using said OAM frames.

10 8. The network of claim 4, wherein the source edge router comprises processing means for generating non-user MPLS packets, and the destination router comprises processing means for receiving and analyzing received non-user MPLS packets.

15 9. The network of claim 1, wherein the transport protocol is Point-to-point over SONET (POS).

10. The network of claim 1, wherein the transport protocol is Gigabit Ethernet.

20 11. In a MPLS packet network comprising at least one source edge router, at least one destination edge router and at least one label switch router connected by transmission links and using a packet transport protocol

providing a protocol type indicator of the transported packet, a method of transmitting packets from the source edge router through the label switch router to the destination edge router, comprising the steps of:

5        assigning different protocol type indicators at the source edge router to user MPLS packets and to non-user MPLS packets of at least one additional protocol type;

         at the label switch router, forwarding MPLS packets received from the source edge router or another label

10       switch router in such a manner as to preserve the protocol type indicator of the packet transport protocol of each received MPLS packet; and

         at the destination edge router, recognizing the protocol type indicator of the transport protocol of the

15       MPLS packets received from the label switch router, and segregating the user MPLS packets from non-user MPLS packets.

12. A method as described in claim 11, wherein the  
20       step of transmitting the traffic comprises transmitting the non-user MPLS packets of said additional protocol type with the same MPLS labels as user MPLS packets.

13. A method as described in claim 12, wherein the step of segregating the user MPLS packets from non-user MPLS packets comprises segregating, based on said protocol type, MPLS packets having the same MPLS label.

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14. A method as described in claim 13, providing transmission of non-user packets from the source edge router to the destination edge router using the same label switched path as for the user MPLS packets.

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15. A method as described in claim 11, the method providing transmission of IP traffic.

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16. A method as described in claim 11, the method providing transmission of OAM&P (operations, administration, maintenance and provisioning) traffic.

17. A method as described in claim 11, the method providing transmission of signalling traffic.

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18. An edge router for an multi-protocol label switch (MPLS) network, including the edge router and at least one label switch router connected by transmission links and using different protocol type indicators of the transported

packets for user MPLS packets and non-user MPLS packets of at least one additional protocol type, the router comprising:

means for transmitting the non-user MPLS packets;

5 means for recognizing the protocol type indicator of the transport protocol of the MPLS packets received from the label switch router; and

means for segregating the user MPLS packets from non-user MPLS packets.

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19. An edge router as described in claim 18, wherein the means for transmitting comprises a multiplexer for multiplexing user and non-user MPLS packets and assigning same MPLS label to the user and non-user packets.

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20. An edge router as described in claim 19, the router being the source edge router.

21. An edge router as described in claim 19, wherein  
20 the means for segregating the user and non-user MPLS packets comprises a demultiplexer, which provides segregation of said packets based on the assigned protocol type indicators.

22. An edge router as described in claim 21, the router being the destination edge router.

23. A label switch router for an multi-protocol label switch (MPLS) network, including at least one edge router and the label switch router connected by transmission links and using different protocol type indicators of the transported packets for user MPLS packets and non-user MPLS packets of at least one additional protocol type, the label switch router comprising:

means for forwarding MPLS packets received from the edge router or from another label switch router in such a manner as to preserve the protocol type indicator of the packet transport protocol of each received MPLS packet.